

What is claimed is:

1. A muffler/exhaust pipe system comprising:
a muffler having an outer shell formed from a composite material wherein a perforated pipe extends through said outer shell;
at least one exhaust pipe connected to said perforated pipe;
a collar having a wide end and a narrow end wherein said narrow end is fitted around said exhaust pipe;
a bushing fitted around said wide end of said collar wherein said muffler shell is in contact with said bushing.
2. The muffler/exhaust pipe system as in claim 1, wherein said collar is clamped to said exhaust pipe.
3. The muffler/exhaust pipe system as in claim 1, wherein said collar is welded to said exhaust pipe.
4. The muffler/exhaust pipe system of claim 1, wherein said collar is constructed of steel.
5. The muffler/exhaust pipe system of claim 1, wherein said collar is a conically shaped collar.
6. The muffler/exhaust pipe of claim 1, wherein said bushing is constructed of a material selected from the group consisting of zirconia, stabilized or modified zirconia, polytetrafluoroethylene, polyimide, polyketone, polyetheretherketone, polyetherketone, and polyamide imide.

7. A muffler/exhaust pipe as set forth in claim 1, wherein said perforated pipe receives exhaust gases and fibrous material provided within said outer shell between said perforated pipe and said outer shell.
8. A muffler/exhaust pipe as set forth in claim 7, wherein said fibrous material comprises a needle felt material.
9. A muffler/exhaust pipe as set forth in claim 7, wherein said fibrous material comprises a loose wool-type product fed into said outer shell via a texturizing device.
10. A muffler/exhaust pipe as set forth in claim 7, wherein said muffler shell comprises first and second parts.
11. A muffler/exhaust pipe as set forth in claim 10, wherein said fibrous material comprises first and second fibrous material preforms which are received respectfully in said first and second shell parts.
12. A muffler/exhaust pipe as set forth in claim 1, wherein said muffler comprises a bumper/muffler assembly, and said bumper/muffler assembly further comprising a heat shield provided between said bumper and said muffler outer shell.
13. A muffler/exhaust pipe as set forth in claim 1, wherein said muffler comprises a bumper/muffler assembly, and said bumper/muffler further comprises a cover for securing said muffler to said bumper.
14. A muffler/exhaust pipe as set forth in claim 1, wherein said muffler comprises a bumper/muffler assembly, and said bumper/muffler comprises a main

body having front, rear, upper and lower surfaces, said front surface facing away from a vehicle, said rear surface facing toward the vehicle, said upper surface facing away from ground and said lower surface facing toward ground, and said main body including a recess formed in said rear surface and one of said upper and lower surfaces for receiving said muffler shell such that said main body provides impact protection for said muffler shell.

15. A muffler/exhaust pipe as set forth in claim 14, wherein a portion of said main body defines at least a part of an outer shell of said muffler.

16. A bumper/muffler/exhaust pipe system comprising:

- a) a bumper/muffler assembly comprising a bumper, a muffler having an outer shell and a perforated pipe extending through said outer shell, said muffler being associated with said bumper;
- b) at least one exhaust pipe;
- c) a flex section for coupling said exhaust pipe to said perforated pipe;
wherein the distance from a centerline through said perforated pipe and said composite muffler shell is longer in the middle section of said composite muffler shell than at either end of the composite muffler shell.

17. A bumper/muffler/exhaust pipe system as set forth in claim 16, wherein said flex section is one of welded and clamped to said exhaust pipe.

18. A bumper/muffler/exhaust pipe system as set out in claim 16, further comprising a bushing having an outer surface engaging said outer shell and an inner surface engaging said flex section.

19. A bumper/muffler/exhaust pipe system as set out in claim 17, wherein said flex section extends only part way through said bushing and abuts said perforated pipe.

20. A bumper/muffler/exhaust pipe system as set out in claim 17, wherein said flex section extends completely through said bushing.

21. A bumper/muffler/exhaust pipe system as set out in claim 16, wherein said flex section comprises a flexible woven metal tube.

22. A bumper/muffler/exhaust pipe system comprising:

- a) a bumper/muffler assembly comprising a bumper,
- b) a muffler having a composite outer shell, said muffler being associated with said bumper, wherein said muffler further comprises metal ends caps at adjacent ends of said muffler;
- c) a perforated pipe extending through said outer shell
- d) at least one exhaust pipe coupled to said perforated pipe.

23. A bumper/muffler assembly as set forth in claim 22, wherein said perforated pipe receives exhaust gases and fibrous material provided within said outer shell between said perforated pipe and said outer shell.

24. A bumper/muffler assembly as set forth in claim 23, wherein said fibrous material comprises a needle felt material.

25. A bumper/muffler assembly as set forth in claim 23, wherein said fibrous material comprises a loose wool-type product fed into said outer shell via a texturizing device.

26. A bumper/muffler assembly as set forth in claim 23, wherein said fibrous material comprises first and second fibrous material preforms which are received respectfully in said first and second shell parts.

27. A bumper/muffler assembly as set forth in claim 22, further comprising a heat shield provided between said bumper and said muffler outer shell.

28. A bumper/muffler assembly as set forth in claim 22, further comprising a cover for securing said muffler to said bumper.

29. A bumper/muffler assembly as set forth in claim 22, wherein said bumper comprises a main body having front, rear, upper and lower surfaces, said front surface facing away from a vehicle, said rear surface facing toward the vehicle, said upper surface facing away from ground and said lower surface facing toward ground, and said main body including a recess formed in said rear surface and one of said upper and lower surfaces for receiving said muffler shell such that said main body provides impact protection for said muffler shell.

30. A bumper/muffler assembly as set forth in claim 29, wherein a portion of said main body defines at least a part of an outer shell of said muffler.

31. A bumper/muffler assembly as set forth in claim 22, wherein said metal material comprises stainless steel.

32. A muffler/exhaust pipe system comprising:

- a) a muffler having an outer shell formed from a composite material wherein a perforated pipe extends through said outer shell;
- b) at least one exhaust pipe connected to said perforated pipe;

c) a bushing fitted around said exhaust pipe and in contact with the interior of said muffler, where said bushing comprises multiple layers of materials.

33. The muffler/exhaust pipe system of claim 32, wherein said bushing comprises at least three layers of materials.

34. The muffler/exhaust pipe system of claim 33, wherein a first, inner layer, fitted around said exhaust pipe, comprises a heat-resistant material.

35. The muffler/exhaust pipe system of claim 33, wherein said first, inner layer comprises a ceramic material

36. The muffler/exhaust pipe system of claim 33, wherein a second, middle layer comprises a heat resistant material.

37. The muffler/exhaust pipe system of claim 36, wherein said second, middle layer comprises a phenolic material.

38. The muffler/exhaust pipe system of claim 33, wherein a third outer layer comprises an expandable material.

39. The muffler/exhaust pipe system of claim 38, wherein said third outer layer comprises a rubberized phenolic material.

40. The muffler/exhaust pipe system of claim 39, wherein said third outer layer comprises a raised bead around said second, inner layer.

41. The muffler/exhaust pipe system of claim 40, wherein said interior of said muffler comprises a groove for receiving said raised bead.

42. The muffler/exhaust pipe system of claim 41, wherein said groove comprises an elastomeric material.

43. The muffler/exhaust pipe system of claim 33, wherein said first, inner layer is welded to said exhaust pipe.